CLAIMS:

1. A transmitter comprising:

- a power amplifier (PA) having a power supply input (PI) and an output (PAO) for supplying a transmission signal (Vo) with an output power (Po),
- a power supply (PS) having power supply outputs (PSO1, PSO2) for supplying a first power supply voltage (PV1) having a first level and a second power supply voltage (PV2) having a second level being higher than the first level,
- a switching circuit (SC) arranged between the power supply outputs (PSO1, PSO2) and the power-supply input (PI), and
- a controller (CO) for supplying, in response to a first power change command (PC) indicating a first desired level of the output power (Po), a control signal to the switching circuit (SC) to supply the first power supply voltage (PV1) to the power supply input (PI), and for supplying, in response to a second power change command (PC) indicating a second desired level of the output power (Po) and succeeding the first power change command (PC), the control signal to the switching circuit (SC) to supply either the first power supply voltage (PV1) or the second power supply voltage (PV2) to the amplifier power supply input (PI) depending on values of said first desired level and said second desired level.

2. A transmitter as claimed in claim 1, wherein the transmitter is a handheld apparatus (HH) and further comprises a receiving circuit (RC) for receiving a power control command (PCB) from a base station (BS) to supply the first power change command (PC) and the second power change command (PC).

3. A transmitter as claimed in claim 1, arranged for operation in a transmission system based on time slots (n-1, n, n+1), and wherein the first power change command (PC) indicates a value of the output power (Po) required during a time slot (n) starting after an instant of occurrence of the first power change command (PC), and wherein the second power change command (PC) indicates a value of the output power (Po) required during a next time slot (n+1) succeeding the first mentioned time slot (n) and starting after an instant of occurrence of the second power change command (PC).

4. A transmitter as claimed in claim 3, wherein the controller (CO) is arranged

- for supplying the control signal to the switching circuit (SC) to supply the second power supply voltage (PV2) to the power amplifier (PA) at substantially an instant the second power change command (PC) indicates that the output power (Po) has to increase, or at the latest at a start of the next time slot (n+1), and

- for controlling the power supply (PS) to increase the first level to above the second level before a start of a time slot (n+2) succeeding the next time slot (n+1).

5. A transmitter as claimed in claim 3, wherein the controller (CO) is arranged for supplying the control signal to the switching circuit (SC) to supply the first power supply voltage (PV1) to the power amplifier (PA) at substantially a start of the next time slot (n+1) if the second power change command (PC) indicates that the output power (Po) has to decrease, and for controlling the power supply (PS) to decrease the second level below the first level.

6. A transmitter as claimed in claim 5, wherein the controller (CO) is arranged for supplying the control signal to the switching circuit (SC) to supply the second power supply voltage (PV2) after the second level decreased below the first level.

7. A transmitter as claimed in claim 5, wherein the controller (CO) is arranged for supplying the control signal to the switching circuit (SC) to supply the second power supply voltage (PV2): at substantially an instant a third power change command (PC) is received during the next time slot (n+1), or at a start of a time slot (n+2) succeeding the next time slot (n+1), if the third power change command (PC) indicates that still the lower output power (Po) indicated by the second power change command (PC) is required.

8. A transmitter as claimed in claim 5, wherein the controller (CO) is arranged for supplying the control signal to the switching circuit (SC) to supply the second power supply voltage (PV2): at substantially an instant a third power change command (PC) is received during the next time slot (n+1), or at a start of a time slot (n+2) succeeding the next time slot (n+1), if the third power change command (PC) indicates that a lower output power (Po) than indicated by the second power change command (PC) is required.

9. A transmitter as claimed in claim 3, wherein the controller (CO) is arranged for supplying the control signal to the switching circuit (SC) to supply the second power supply voltage (PV2) to the power amplifier (PA) at substantially the instant the second power change command (PC) is received, or at substantially a start of the next time slot (n+1), if the second power change command (PC) indicates that the output power (Po) has to decrease, and for controlling the power supply (PS) to allow the second level to drop, while the first level is kept substantially constant.

10. A transmitter as claimed in claim 3, wherein the controller (CO) is arranged for supplying the control signal to the switching circuit (SC) to supply the first power supply voltage (PV1) to the power amplifier (PA) at substantially the instant the second power change command (PC) indicates that the output power (Po) has to decrease, and for controlling the power supply (PS) to allow the first level to drop.

11. A transmitter as claimed in claim 10, wherein the controller (CO) is arranged for controlling the power supply (PS) to keep the level of the non-used second power supply voltage substantially constant.

12. A transmitter as claimed in claim 1, wherein the power supply (PS) is arranged for supplying a third power supply voltage (PV3) having a third level, and wherein the controller (CO) is arranged for dynamically controlling the power supply (PS) to supply the second level which is higher than the first level, and the third level which is lower than the first level.

13. A transmitter as claimed in claim 12, wherein the controller (CO) is arranged for controlling the switching circuit (SC) to supply either the first power supply voltage (PV1), the second power supply voltage (PV2), or the third power supply voltage (PV3) to the amplifier power supply input (PI), depending on whether the second power change command (PC) indicates that the output power (Po) has to be stable, to increase, or to decrease, respectively.

14. A transmitter as claimed in claim 12, wherein the controller (CO) is arranged for controlling

- the switching circuit (SC) to supply either the second power supply voltage

(PV2) or the third power supply voltage (PV3) to the amplifier power supply input (PI) if the output power (Po) has to be changed, and

- the power supply (PS) to only adapt the second level or the third level depending on whether the second level or the third level has the largest difference from a level of a power supply voltage (PV) supplied to the amplifier power supply input (PI).

15. A transmitter as claimed in claim 12, wherein the controller (CO) is adapted for controlling

- the switching circuit (SC) to supply either the second power supply voltage (PV2) or the third power supply voltage (PV3) to the amplifier power supply input (PI) if the output power (Po) has to be changed, and

- the power supply (PS) to adapt

(i) the first level and the third level if the second power supply voltage (PV2) is supplied to the amplifier power supply input (PI), wherein the first level is controlled for exceeding the second level, or

(ii) the first level and the second level if the third power supply voltage (PV3) is supplied to amplifier power supply input (PI), wherein the first level is controlled for exceeding the third level.

16. A method in a transmitter comprising a power amplifier (PA) having a power supply input (PI) and an output (PAO) for supplying a transmission signal (Vo) with an output power (Po), and a power supply (PS) having power supply outputs (PSO1, PSO2) for supplying a first power supply voltage (PV1) having a first level and a second power supply voltage (PV2) having a second level, higher than the first level, the method comprising:

- controlling (CO, SC), the first power supply voltage (PV1) to be supplied to the power supply input (PI), in response to a first power change command (PC) indicating a first desired level of the output power (Po), and

- controlling (CO, SC), either the first power supply voltage (PV1) or the second power supply voltage (PV2) to be supplied to the amplifier power-supply input (PI) in response to a second power change command (PC) indicating a second desired level of the output power (Po) and succeeding the first power change command (PC), depending on values of said first desired level and said second desired level.

17. A method as claimed in claim 16, wherein the transmitter is arranged for operation in a transmission system based on time slots (n-1, n, n+1), and wherein the first power change command (PC) indicates a value of the output power (Po) required during a time slot (n) starting after an instant of occurrence of the first power change command (PC), and wherein the second power change command (PC) indicates a value of the output power (Po) required during a next time slot (n+1) succeeding the first mentioned time slot (n) and starting after an instant of occurrence of the second power change command (PC).

18. A system comprising a base station and a transmitter comprising:

- a power amplifier (PA) having a power supply input (PI) and an output (PAO) for supplying a transmission signal (Vo) with an output power (Po),
- a power supply (PS) having power supply outputs (PSO1, PSO2) for supplying a first power supply voltage (PV1) having a first level and a second power supply voltage (PV2) having a second level, higher than the first level,
- a switching circuit (SC) arranged between the power supply outputs (PSO1, PSO2) and the power supply input (PI), and
- a controller (CO) for supplying a control signal to the switching circuit (SC) in response to a first power change command (PC) indicating a first desired level of the output power (Po), to supply the first power supply voltage (PV1) to the power-supply input (PI), and for supplying, the control signal to the switching circuit (SC), in response to a second power change command (PC) indicating a second desired level of the output power (Po) and succeeding the first power change command (PC) to supply either the first power supply voltage (PV1) or the second power supply voltage (PV2) to the amplifier power supply input (PI) depending on values of said first desired level and said second desired level.

19. A system as claimed in claim 18, wherein the transmitter is arranged for operation in a transmission system based on time slots (n-1, n, n+1), and wherein the first power change command (PC) indicates a value of the output power (Po) required during a time slot (n) starting after an instant of occurrence of the first power change command (PC), and wherein the second power change command (PC) indicates a value of the output power (Po) required during a next time slot (n+1) succeeding the first mentioned time slot (n) and starting after an instant of occurrence of the second power change command (PC).